



TETRA TECH EC, INC.

June 28, 2010
TtEC-SEA-2010-SCI004

Kira Lynch
U.S. EPA. Region 10
1200 Sixth Ave. Suite 900
Seattle, WA 98101

SUBJECT: Results of Year 6 Operations, Maintenance, and Monitoring Plan Site Activities; Head of the Thea Foss Waterway Remediation, Tacoma, WA

Dear Ms. Lynch:

The Utilities are pleased to submit the results of the Year 6 Operation, Maintenance and Monitoring Plan (OMMP) site activities for the Utilities' Work Area in the Head of the Thea Foss Waterway. The Year 6 OMMP Technical Memorandum is being submitted for EPA's review and approval. Two copies of the report are enclosed. Copies are also being sent to others as listed below.

The preparation of the Year 6 OMMP Technical Memorandum was consistent with the requirements of the Consent Decree, Statement of Work, and the EPA approved OMMP. Year 6 of the OMMP has no requirement to conduct physical cap integrity monitoring. No qualifying events (e.g., earthquakes or large storms) that would have triggered the need for monitoring have occurred since the last monitoring event. However, as a follow up to recommendations made in the Year 5 OMMP report, a field crew was mobilized to the site to conduct observations and maintenance activities at Outfall #235. In addition, a brief site walk was conducted at low tide. The attached technical memorandum summarizes activities performed and observations that were made.

If you have any questions or comments, please call me at 425-482-7840 or email me at gary.braun@tteci.com.

Sincerely,
Tetra Tech EC, Inc.

A handwritten signature in black ink that reads 'Gary Braun'.

Gary Braun
Project Manager



Enclosure: Year 6 OMMP Technical Memorandum (June 2010)

cc:

Cover Letter and Hard Copy:

Kira Lynch, U.S. EPA (2 copies)

Kris Flint, U.S. EPA

Mary Henley, City of Tacoma

Leslie Ann Rose, Citizens for a Healthy Bay

May Carrell, U.S. Army Corps of Engineers (2 copies)

Matt Dalton, Dalton, Olmsted & Fuglevand, Inc.

Loren Dunn, Riddell Williams

Richard Gleason, Stoel Rives

John Rork, Puget Sound Energy

Jackie Wetzsteon, PERCo

John O'Loughlin, City of Tacoma

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Dave Smith, Washington State Department of Ecology

Bill Sullivan, Puyallup Tribe of Indians



TETRA TECH EC, INC.

Memorandum

Date: June 3, 2010
To: Jacqueline Thiell Wetzsteon, PacifiCorp
From: Benjamin Starr *Benjamin I. Starr* and Gary Braun *Gary Braun*
RE: Low Tide Site Observations and Maintenance
April 19, 2010
Head of the Thea Foss Waterway Project

This memorandum presents a summary of observed site conditions and maintenance activities conducted at the Head of the Thea Foss Waterway, Tacoma, Washington. The work was performed by Benjamin Starr, Civil Engineer and Katrina Conlon, Environmental Scientist for Tetra Tech EC, Inc. (TtEC). Ben Starr and Katrina Conlon visited the site between approximately 2:00 pm and 5:00 pm PDT on April 19, 2010. During this period, a low tide of -2.0 feet Mean Lower Low Water (MLLW) was predicted for 3:15 pm PDT.

The purposes of this site visit were to:

- Observe the general condition of the shoreline armor placed adjacent to Outfall #235 and restore disturbed shoreline cap areas;
- Observe the general condition of Outfall #235 wing walls and document any changes from previous observations; and
- Briefly document observed site conditions during a low daytime tide, as a supplement to the Operation, Maintenance and Monitoring (OMMP) activities for the Head of the Thea Foss Waterway Project.

Outfall #235 Observations and Maintenance Activities

Condition of Outfall #235 Wing Walls:

At Outfall 235, both wing walls are separating from the Outfall 235 head wall. At the low-tide site-walk conducted in May 2008 (Year 4 OMMP), it was observed that the City of Tacoma had installed PK nails on the north and south ends of the top of the headwall and on the west ends of the north and south wing walls to enable monitoring of any movement between the headwall and the wing walls. The separation between the head wall and the south wing wall is larger than the separation between the head wall and the north wing wall. The distances measured during this site visit between the sets of PK nails were approximately 9 1/2 inches and 7 3/4 inches respectively, slightly greater than the distances measured during Year 5 observations (9 3/8

inches and 7 1/2 inches respectively) (Figures 1 and 2). Some loss of habitat mix material from slopes adjacent to the wing walls through the cracks in the wing walls was observed.

Condition of the Scour Protection Placed Adjacent to Outfall #235:

As noted during the Year 5 OMMP low tide site observations and documented in Tetra Tech's August 28, 2009 Technical Memorandum, the scour protection adjacent to Outfall 235 (at Station 73+20 on the west side of the waterway under the SR-509 bridge) appeared to have been intentionally displaced directly in front of the outfall to make a pool with a sandy bottom, possibly for bathing as there was evidence that there are displaced persons living in the immediate area. The slope armor adjacent to both the south and north wing walls was observed to have been displaced or sloughed, leaving the underlying slope cap exposed (Figures 3 -5). It is believed the intentional displacement of the outfall scour material in front of Outfall 235 and from the toe of adjacent slopes contributed to instability and caused downward movement of armor material from the slope areas. As a result, the underlying slope cap became exposed and potentially subject to erosion. The Year 5 OMMP Technical Memorandum recommended restoration of the outfall scour protection to ensure the integrity of the underlying slope cap. At the time of the site visit in April 2010 (Year 6), the area of exposed slope cap adjacent to both the south and north wing walls appears slightly greater than was observed during Year 5 OMMP (Figures 3 through 5).

Slope Armor Maintenance Actions Adjacent to Outfall #235:

The objective of maintenance activities conducted during this site visit was to restore slope armor stone to the slopes adjacent to the south and north outfall wing walls. This armor stone covers and provides additional protection to the underlying, finer-grained sand isolation cap from potential erosion due to wind/wave-action.

Armor stones that had been removed from in front of the outfall to make room for a sandy pool were restacked adjacent to each side of the outfall. Larger stones were stacked at the toe of the slope, to create a small retaining berm. Smaller stones were stacked behind this berm, extending up the slope on either side of the outfall. As stones were removed from an approximately half-moon shaped ring at the perimeter of the pool, it was observed that the stones had been stacked in alternating layers with pieces of clothing and debris, further corroborating the supposition that armor stone had been intentionally displaced. Figures 3 through 5 illustrate the sloughed areas before maintenance activities were conducted. Figure 6 shows the results of the successful maintenance activities and documents the condition of these areas once the armor stone had been replaced. The slope areas adjacent to Outfall #235 will be monitored during future OMMP events to observe the condition of the armor and underlying slope cap.

Site-Wide Observations

Year 6 of the OMMP has no requirement to conduct physical cap integrity monitoring. No qualifying events (e.g., earthquakes or large storms) that would have triggered the need for monitoring have occurred since the last monitoring event. However, because a field crew had mobilized to the site to conduct observations and maintenance activities at Outfall #235, a brief site walk was conducted at low tide. The following briefly summarizes observations that were made.

Condition of the Scour Protection Apron Placed at the Head of the Waterway:

The condition of the scour protection apron at the south end of the waterway was consistent with observations presented in the Year 5 OMMP Technical Memorandum. Water was flowing out of Outfalls 237a and 237b during the site visit. Discharge from these outfalls was spreading out over the apron and flowing northward towards the turning basin. As previously noted in the Years 0 through 5 low tide site observations, a small, shallow channel is present in the apron near the southeast corner of the waterway. The configuration and shallow depth of this channel appear unchanged from previous observations and the overall integrity of the cap has not been adversely impacted by the presence of this localized feature. Slight foaming was observed in the water discharging from the twin 96-inch outfalls; no sheen was observed.

General Condition of the Waterway Slopes Exposed at Low Tide:

No slope erosion or sloughing was observed. As previously noted in the Years 0 through 5 site observation memoranda, the coarser slope cap materials was covered with algae, seaweed, and barnacles. Mussels were also present on these materials. A layer of olive and gray silt was present over capping material on the lower portions of the east and west bank slopes.

Observations in the Vicinity of the Former SR-509 Seep Area:

Gas bubbles were observed in the vicinity of the former SR-509 seep area during the site visit but no sheens were observed. As in previous field events, the shadow of the SR-509 Bridge did not allow for quality photos of this area from the east bank slope during the site visit.

General Observations:

- The weather was partly cloudy, and temperature in the mid- 50s during this field visit.
- Gas bubbling was observed throughout the head of the waterway but no sheens were observed.
- Crabs, mussels, barnacles, geese, hooded merganser, seagulls, mallard ducks, starfish, seaweed and algae were observed at site during the site visit.
- The scour protection adjacent to Outfall 243 (at Station 73+40 on the east side of the waterway under the SR-509 Bridge) shows no further signs of erosion or displacement. A small flow of water was exiting the Outfall 243 during the site visit. The Tideflex™ valve at the end of Outfall 243, which was extensively covered with barnacles and mussels at the time of the year 5 observations, appears to have been cleaned.
- The new kayak float on the east side of the Waterway just south of the SR-509 Bridge is in use. One recreational kayaker was observed using the facility when Katrina Conlon arrived onsite.
- At the scaffolding company property on the east side of the waterway, a new fence and combination ecology block and sand berm was observed. This appeared to be a stormwater best management practice that had been recently implemented.

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Figure 17– Looking north along the west slope of the Waterway

FIGURES



Figure 1 – Outfall #235 south wingwall separation



Figure 2 – Outfall #235 north wingwall separation



Figure 3 – Looking at Outfall #235 prior to maintenance activities



Figure 4 – Looking at south side of Outfall #235 prior to maintenance activities



Figure 5 – Looking at north side of Outfall #235 prior to maintenance activities



Figure 6 – Looking at Outfall #235 following maintenance activities



Figure 7 – Looking southwest at scour apron at the head of the waterway



Figure 8 – Looking south at twin 96-inch outfalls – Outfalls 237A and 237B



Figure 9 – Looking south across the narrow channel near SE corner of the waterway



Figure 10 – Looking south at flow from twin 96-inch outfalls



Figure 11 – Looking north at the east slope of the waterway from under the SR-509 Bridge (duckbill on Outfall #243 visible at right)



Figure 12 – Outfall #243 on east side of waterway under the SR-509 Bridge



Figure 13 – Looking west at recently installed kayak dock



Figure 14 – Looking east along the east slope of the waterway towards scaffolding company. Note recent ecology block and sand berm.



Figure 15 – Looking south along the east slope of the waterway, adjacent to scaffolding company. Note recent ecology block and sand berm.



Figure 16– Gas bubbles emanating from sediment. East side of waterway, adjacent to scaffolding company property



Figure 17– Looking north along the west slope of the Waterway